VIT®
Vellore Institute of Technology
(Deemed to be University under section 3 of UGC Act, 1956)

SLOT: A1+TA1

REG.NO.:

SCHOOL OF MECHANICAL ENGINEERING
CONTINUOUS ASSESSMENT TEST (CAT) -II
FALL SEMESTER 2024-2025

Programme Name & Branch	: B.Tech (BME & BMM)
Course Code	: BMEE202L
Course Name	: MECHANICS OF SOLIDS
Faculty Name(s)	: M. VELU, RAHUL SINGH SIKARWAR, SENTHIL NATHAN N, SHARAN CHANDRAN M
Class Number(s)	: VL2024250103821, 3818, 3819 and 3820
Exam Duration	: 90 minutes Maximum Marks: 50

Answer all questions

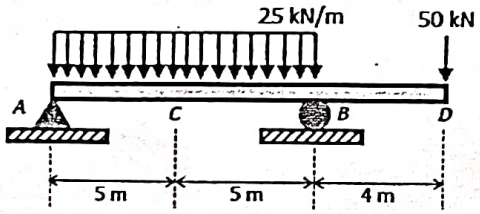
General instruction(s):

- M - Max mark; CO – Course Outcome; BL – Bloom's Taxonomy Level (BL1 – Remembering, BL2 – Understanding, BL3 – Applying, BL4 – Analysing, BL5 – Evaluating, BL6 – Creating)
- Course Outcomes

CO 2: Illustrate the relationship among load, shear force and bending moment for various beams

CO 3: Evaluate the bending and shear stresses for beams with varying cross sections

CO 4: Calculate the slope and deflection of various beams

Q. No	Question	M	CO	BL
1.	A cantilever beam of length 5m carries a uniformly distributed load of 4 kN/m for a length of 3m from fixed end. It also carries a concentrated load of 5 kN and a clockwise moment of 20 kNm at its free end. Draw the shear force and bending moment diagram for the beam.	10	CO 2	BL3
2.	Determine the point of contraflexure for the beam shown in fig. 1  Fig. 1	10	CO 2	BL5
3.	A cantilever AC of length 5m, carries a point load of 25 kN at its free end 'C'. It also carries a uniformly distributed load of 50 kN/m over a length AB of 2m. Determine the deflection at the free end.	10	CO 4	BL4
4.	A simply supported beam shown in Fig .2 has cross sectional area as shown in Fig.3. Determine the absolute maximum bending stress in the beam.	10	CO 3	BL3

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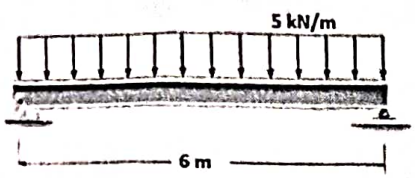


Fig. 2

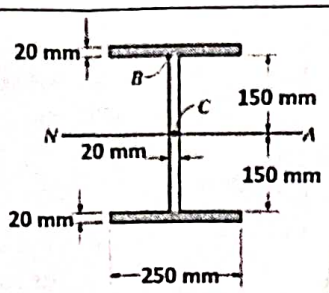
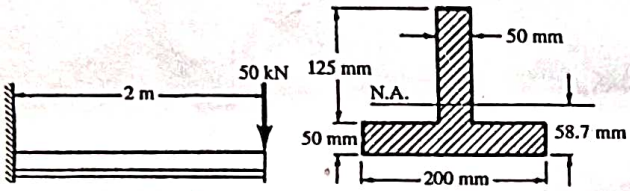


Fig. 3

5.	Consider the cantilever beam subject to the concentrated load as shown in Fig. 4. Determine the maximum shearing stress due to the shear force of 50 kN. Also determine the shearing stress at 25 mm from the top surface of the beam.  Fig. 4	10	CO 3	BL3

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